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Description

Electromagnetic switching device

- 5 The present invention relates to an electromagnetic switching device, in particular a contactor, having an electromagnetic drive apparatus and having at least one electrical contact,
- in which case the contact can be moved by means of
- 10 a contact link support from a disconnected position to a bridging position by the electromagnetic drive apparatus when a pull-in current is applied to the electromagnetic drive apparatus,
- 15 - with the contact being closed in the bridging position and being open in the disconnected position,

Switching devices such as these are generally known.

20 Merely by way of example, reference is made to US-A-3,745,492, US-A-5,844,186 and WO 99/56295 A1.

In order to ensure that electrical systems are not live while work is being carried out on or in these systems,

25 main switches and switching devices with disconnector characteristics are specified. On the one hand, these must reliably signal, either by means of a visible disconnection gap or by an indication which reliably indicates the switching state of the device, the

30 disconnection of the system from the supply. In particular, however, they must allow blocking which reliably prevents accidental connection. Furthermore, the switching point must reliably withstand an increased voltage.

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Furthermore, predetermined creepage currents must not be exceeded.

Devices of this type are described, for example, in  
5 IEC 60947-2 and IEC 60947-3. These Standards are  
implemented in electrical devices such as  
disconnectors, load disconnectors,

safety load disconnectors and circuit breakers with a disconnection function, and similar devices.

Electromagnetic switching devices according to the  
5 prior art as cited above satisfy these requirements.

The object of the present invention is to provide a further electromagnetic switching device of the generic type.

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The object is achieved

- in that the electromagnetic switching device has a basic appliance and an additional appliance which is connected to the basic appliance,
- 15 - in that the contact link support and the contact are arranged in the basic appliance,
- in that the additional appliance has an extension which is connected to the contact link support in such a way that the extension is positively guided  
20 by the contact link support, and
- in that the extension can be mechanically blocked by means of a locking element which can be connected to the additional appliance and can be blocked in the disconnected position of the  
25 contact, such that the extension and, with it, the contact link support and the contact as well is locked in the disconnected position even when the pull-in current is applied to the electromagnetic drive apparatus.

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If the contact can be blocked in a locking element holder by the insertion of the locking element, the switching device has a particularly simple physical design. The locking element holder may in this case  
35 alternatively be open on both sides or on only one side.

If the locking element is held captive in the  
additional appliance, no separate element is required  
for blocking the contact. Furthermore, in this case,  
5 the locking element may be matched to the additional

appliance, in particular to any locking element holder. Tolerances are therefore known in advance, and can be minimized.

5 If the additional device has an additional switch which can be connected in a circuit via which the pull-in current can be applied to the electromagnetic drive apparatus, a power supply for the electromagnetic drive apparatus can be interrupted at the switching device.

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If the additional switch is arranged and designed such that it is opened when the contact is mechanically blocked, it is not possible for opening of the coil circuit to be accidentally prevented.

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The connection between the additional appliance and the basic appliance may alternatively be detachable or non-detachable. At least when the contact is mechanically blocked in the disconnected position, the additional  
20 appliance should, however, be connected non-detachably to the basic appliance.

The connection between the basic appliance and the additional appliance is particularly simple if the  
25 additional appliance is latched to the basic appliance.

As a result of the configuration of the basic appliance, the additional appliance should be adjacent to the basic appliance on an appliance side which runs  
30 at right angles to a movement direction of the contact link support.

If the switching device can be connected to an auxiliary switch housing in which an auxiliary switch  
35 is arranged which can be operated by the contact link

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support together with the contact, the switching device  
can be used more flexibly. The auxiliary switch is in  
this case preferably connected to the contact link  
support without any play. However, alternatively, the  
5 connection may be direct or indirect.

Further advantages and details will become evident from the following description of exemplary embodiments in conjunction with the drawings in which, illustrated in outline form:

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Figure 1 shows a section through an electromagnetic switching device,  
Figures 2 and 3 show modifications of Figure 1, and  
Figure 4 shows a section through a further  
10 electromagnetic switching device.

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Figures 1 and 2 show a basic appliance 1 of an electromagnetic switching device in the form of a contactor, by way of example. The contactor has, inter  
15 alia, an electromagnetic drive apparatus 2, an armature 3, a contact link support 4 and, generally two or more, electrical contacts 5. For the sake of clarity, only one contact 5 is in this case illustrated in Figures 1 and 2. Each contact 5 generally comprises two  
20 stationary contact points 5' and one moving contact link 5''.

20

The electromagnetic drive apparatus 2 has a coil 2' and a coil core 2''. A pull-in current I can be applied to  
25 the coil 2' via a drive unit 6. In this case, the armature 3 is pulled in, thus moving the contact link support 4, and, with it, the contact link 5'' to a bridging position in which the contact 5 is closed. This state is illustrated in Figure 1.

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When, on the other hand, no pull-in current I is applied to the coil 2'', the contact link support 4 and, with it, the contact link 5'' are moved by means of a return spring to a disconnected position, in which

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the contact 5 is open. This position is illustrated in Figure 2. The return spring is not illustrated in this case, for the sake of clarity.

**AMENDED SHEET**



During the movement from the disconnected position to the bridging position, and vice versa, the contact link support 4 is moved in a movement direction x. As can be  
5 seen from Figures 1 and 2, an additional appliance 7 is adjacent to the basic appliance 1. The additional appliance 7 is in this case adjacent to the basic appliance 1 on an appliance side which runs at right angles to the movement direction x.

holder 9 have interacting holding and latching elements 17, 18, by means of which the locking element 11 is held captive in the additional appliance 7. As can be seen from Figure 4, one of the holding and latching elements 17, 18 corresponds to an operating member for the additional switch 14. The operating member for the additional switch 14 could, however, also be a separate element.

- 10 The refinement of the electromagnetic switching device according to the invention thus allows disconnector characteristics to be added to the electromagnetic switching device in a simple manner.

Patent Claims

1. An electromagnetic switching device, in particular a contactor, having an electromagnetic drive apparatus (2) and having at least one electrical contact (5),
- 5 (2) and having at least one electrical contact (5),
- in which case the contact (5) can be moved by means of a contact link support (4) from a disconnected position to a bridging position by the electromagnetic drive apparatus (2) when a

10 pull-in current (I) is applied to the electromagnetic drive apparatus (2),

  - with the contact (5) being closed in the bridging position and being open in the disconnected position,

15 characterized

    - in that the electromagnetic switching device has a basic appliance (1) and an additional appliance (7) which is connected to the basic appliance (1),
    - in that the contact link support (4) and the

20 contact (5) are arranged in the basic appliance (1),

    - in that the additional appliance (7) has an extension (8) which is connected to the contact link support (4) in such a way that the extension

25 (8) is positively guided by the contact link support (4), and

    - in that the extension (8) can be mechanically blocked by means of a locking element (11) which can be connected to the additional appliance (7) and can be blocked in the disconnected position of the contact (5), such that the extension (8) and, with it, the contact link support (4) and the contact (5) as well is locked in the disconnected position even when the pull-in current (I) is

30 applied to the electromagnetic drive apparatus (2).

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2. The switching device as claimed in claim 1,  
characterized  
in that the contact (5) can be blocked in a locking  
5 element holder (9) by insertion of the locking element  
(11).

3. The switching device as claimed in claim 2,  
characterized  
in that the locking element holder (9) is open on both  
sides.

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4. The switching device as claimed in claim 2,  
characterized  
in that the locking element holder (9) is open on only  
one side.

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5. The switching device as claimed in one of the  
above claims,  
characterized  
in that the locking element is held captive in the  
15 additional appliance (7).

6. The switching device as claimed in one of the  
above claims,  
characterized  
20 in that the additional appliance (7) has an additional  
switch (14) which can be connected in a circuit via  
which the pull-in current (I) can be applied to the  
electromagnetic drive apparatus (2).

25 7. The switching device as claimed in claim 6,  
characterized  
in that the additional switch (14) is arranged and  
designed such that it is opened when the contact (5) is  
mechanically blocked.

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8. The switching device as claimed in one of the  
above claims,  
characterized

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in that the additional appliance (7) is connected to the basic appliance (1) non-detachably at least when the contact (5) is mechanically blocked in the disconnected position.

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9. The switching device as claimed in one of the above claims,  
characterized

in that the additional appliance (7) is latched to the  
10 basic appliance (1).

10. The switching device as claimed in one of the  
above claims,  
characterized

5 in that the additional appliance (7) is adjacent to the  
basic appliance (1) on an appliance side which runs at  
right angles to a movement direction (x) of the contact  
link support (4).

10 11. The switching device as claimed in one of the  
above claims,  
characterized

15 in that an auxiliary switch housing (15) can be  
connected to the switching device and has an auxiliary  
switch (16) arranged in it, which can be operated by  
the contact link support (4) together with the contact  
(5).

12. The switching device as claimed in claim 13,  
characterized  
20 in that the auxiliary switch (16) can be operated -  
directly or indirectly - by the contact link support  
(4) without any play.

13. An additional appliance for an electromagnetic  
25 switching device as claimed in one of the above claims.